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Variable electron correlation in high-quality MBE- and PLD-grown SrRuO₃ thin films. WOLTER SIEMONS, GERTJAN KOSTER, Stanford University, HIDEKI YAMAMOTO, NTT Basic Research Laboratories, ARTURAS VAILIONIS, THEODORE GEBALLE, Stanford University, DAVE BLANK, University of Twente, MALCOLM BEASLEY, Stanford University — We show that systematic variations in the degree of correlation can occur within SrRuO₃ as a function of disorder/off-stoichiometry. In particular, we find that one source of disorder can be controlled in SrRuO₃ thin films by varying the deposition conditions or the deposition technique. Specifically, we clearly demonstrate that variation of vacancies on the ruthenium site gives rise to a variation in correlated behavior as seen in the photoemission spectra (XPS and UPS). Moreover, the transport properties of our samples are clearly linked to their photoemission spectra, and independently the crystal unit cell parameters. SrRuO₃ appears to be a system where these effects can be studied in a more systematic fashion, usually not easily accessible, but we suspect that the underlying physics is generic in complex oxides. Work supported by the DoE BES and EPRI.

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